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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee: Satoru Toguchi *et al.* Issued: June 22, 2004

Patent No.: 6,753,097 B2 -01 961,230

For: **ORGANIC ELECTROLUMINESCENT DEVICE**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CERTIFICATE OF CORRECTION
UNDER 37 C.F.R. 1.322
OFFICE MISTAKE

Sir:

Transmitted herewith in duplicate is PTO Form 1050 - Certificate of Correction for the above-identified U.S. Patent correcting the Office mistake as shown in the enclosed Certificate of Correction form.

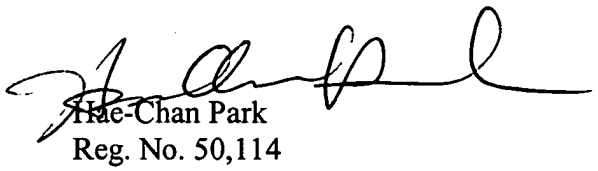
The correction for the Office mistake is reflected in the attached copy of the Amendment filed January 14, 2004, with the U.S. Patent and Trademark Office.

Also enclosed is a copy of the Letters Patent, with the requested correction marked in red ink.

Since the above-mentioned matter was correctly shown in the Amendment, issuance of a Certificate of Correction is in order. Since this error was due to the Patent and Trademark Office, no fee is submitted herewith.

If any error is determined to be on part of the applicants, please charge all necessary fees to attorney's deposit account no. 23-1951.

Respectfully submitted,



Hae-Chan Park
Reg. No. 50,114

Date: August 20, 2004

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(703) 712-5000

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.: 6,753,097 B2
DATED: June 22, 2004
INVENTOR: Satoru Toguchi *et al*

It is certified that errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below.

Column 51,
Line 12, delete "R^1" and insert, --R^8--.

MAILING ADDRESS OF SENDER:

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PATENT NO.: 6,753,097 B2
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FORM PTO 1050 (Rev. 2-93)

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US006753097B2

(12) **United States Patent**
Toguchi et al.

(10) **Patent No.: US 6,753,097 B2**
(45) **Date of Patent: Jun. 22, 2004**

(54) **ORGANIC ELECTROLUMINESCENT DEVICE**

(75) Inventors: **Satoru Toguchi**, Tokyo (JP); **Atsushi Oda**, Tokyo (JP); **Hitoshi Ishikawa**, Tokyo (JP)

(73) Assignee: **Samsung SDI Co., Ltd.**, Suwon (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 163 days.

(21) Appl. No.: **09/961,230**

(22) Filed: **Sep. 24, 2001**

(65) **Prior Publication Data**

US 2002/0028350 A1 Mar. 7, 2002

Related U.S. Application Data

(62) Division of application No. 09/186,081, filed on Nov. 5, 1998, now Pat. No. 6,329,083.

(30) **Foreign Application Priority Data**

Nov. 5, 1997 (JP) 9-303047
Nov. 5, 1997 (JP) 9-303048
Dec. 25, 1997 (JP) 9-357022
Jan. 6, 1998 (JP) 10-000886

(51) **Int. Cl.**[7] **H05B 33/14**
(52) **U.S. Cl.** **428/690**; 428/917; 313/504; 313/506
(58) **Field of Search** 428/690, 917; 313/504, 506

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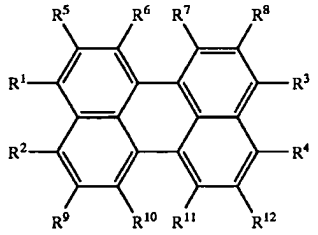
Primary Examiner—Marie Yamnitzky
(74) *Attorney, Agent, or Firm*—McGuireWoods LLP

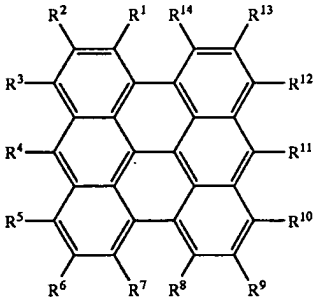
(57) **ABSTRACT**

An electroluminescence device includes an anode, a cathode and at least one organic layer sandwiched between the anode and the cathode, the organic layer including at least a light emitting layer which includes at least one of compound C1, compound C2 and compound C4, alone or in combination:

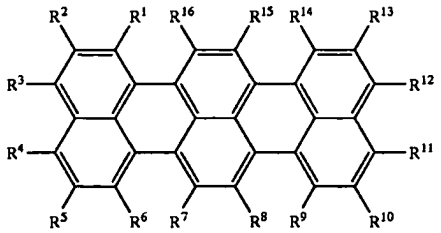
C1



C2



C4



17 Claims, 1 Drawing Sheet

tuted or unsubstituted amino group, a nitro group, a cyano group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted alkoxy group, a substituted or unsubstituted aromatic hydrocarbon group, a substituted or unsubstituted aromatic heterocyclic group, substituted or unsubstituted aralkyl group, a substituted or unsubstituted aryloxy group, a substituted or unsubstituted alkoxycarbonyl group, or a carboxyl group, and

wherein any two of R^1 to R^7 may form a ring, and any two of R^8 to R^{14} may form a ring.

2. The organic electroluminescent device as set forth in claim 1, wherein said organic layer includes a hole transporting layer containing said compound represented with said chemical formula C2, alone or in combination.

3. The organic electroluminescent device as set forth in claim 1, wherein said organic layer includes an electron transporting layer containing said compound represented with said chemical formula C2, alone or in combination.

4. The organic electroluminescent device as set forth in claim 1, wherein said organic layer includes both a hole transporting layer and an electron transporting layer, said electron transporting layer containing said compound represented with said chemical formula C2, alone or in combination.

5. The organic electroluminescent device as set forth in claim 1, wherein said anode has a work function equal to or greater than 4.5 eV.

6. The organic electroluminescent device as set forth in claim 5, wherein said cathode has a smaller work function than that of said anode.

7. The organic electroluminescent device as set forth in claim 1, wherein said organic layer has a thickness in the range of 1 nanometer to 1 micrometer both inclusive.

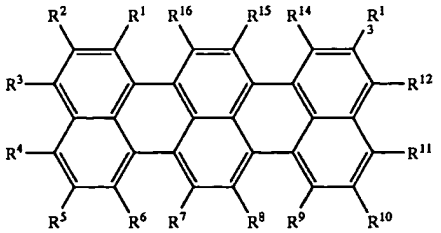
8. An electroluminescent device comprising:

an anode;

a cathode; and

at least one organic layer sandwiched between said anode and said cathode, said organic layer including at least a light emitting layer which comprises a terylene compound represented with the chemical formula C4, alone or in combination:

C4



wherein R^1 to R^{16} each independently represents a hydrogen atom, a halogen atom, a hydroxyl group, a substituted or unsubstituted amino group, a nitro group, a cyano group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted alkoxy group, a substituted or unsubstituted aromatic hydrocarbon group, a substituted or unsubstituted aromatic heterocyclic group, a substituted or unsubstituted aralkyl group, a substituted or unsubstituted aryloxy group, a substituted or unsubstituted alkoxycarbonyl group, or a carboxyl group, and

wherein any two of R^1 to R^{16} may form a ring, and

wherein at least one of R^1 to R^{14} is a di-aryl amino group represented with $-NAr^1Ar^2$ where each of Ar^1 and Ar^2 independently indicates an aryl group having a carbon number of 6 to 20 both inclusive.

9. The organic electroluminescent device as set forth in claim 8, wherein said organic layer includes a hole transporting layer containing said terylene compound represented with said chemical formula C4, alone or in combination.

10. The organic electroluminescent device as set forth in claim 8, wherein said organic layer includes an electron transporting layer containing said terylene compound represented with said chemical formula C4, alone or in combination.

11. The organic electroluminescent device as set forth in claim 8, wherein said light-emitting layer comprises a red light-emitting layer.

12. The organic electroluminescent device as set forth in claim 8, wherein each of said aryl groups Ar^1 and Ar^2 has a substituent.

13. The organic electroluminescent device as set forth in claim 8, wherein at least one of said Ar^1 and Ar^2 includes a substituted or unsubstituted styryl group as a substituent.

14. The organic electroluminescent device as set forth in claim 13, wherein each of said aryl groups Ar^1 and Ar^2 has a substituent.

15. The organic electroluminescent device as set forth in claim 8, wherein said anode has a work function equal to or greater than 4.5 eV.

16. The organic electroluminescent device as set forth in claim 15, wherein said cathode has a smaller work function than that of said anode.

17. The organic electroluminescent device as set forth in claim 8, wherein said organic layer has a thickness in the range of 1 nanometer to 1 micrometer both inclusive.

* * * * *

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Satoru Toguchi, et al.

Serial No.: 09/961,230 **Group Art Unit:** 1774

Filed: September 24, 2001 **Examiner:** Yamnitzky, Marie Rose

For: ORGANIC ELECTROLUMINESCENT DEVICE

Honorable Commissioner of Patents
Alexandria, VA 22313-1450
Box AF

AMENDMENT UNDER 37 C.F.R. §1.116

Sir:

In response to the Office Action dated October 14, 2003, please amend the above-identified application as follows:

AMENDMENTS TO THE CLAIMS:

Please cancel claims 1-6 and 34 without prejudice or disclaimer.

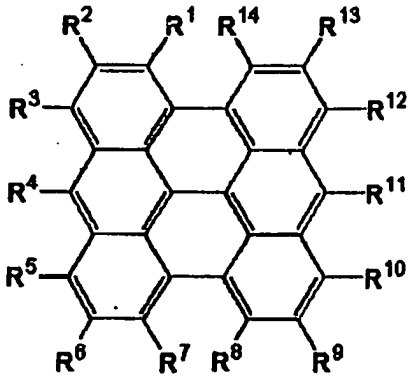
Claims 1-6 (Canceled)

Claim 7. (~~Presently presented~~) A electroluminescent device comprising:

an anode;

a cathode; and

at least one organic layer sandwiched between said anode and said cathode, said organic layer including at least a light emitting layer which comprises a bisanthrene compound represented with the chemical formula C2, alone or in combination:



C2

wherein R^1 to R^{14} each independently represents a hydrogen atom, a halogen atom, a hydroxyl group, a substituted or unsubstituted amino group, a nitro group, a cyano group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted alkoxy group, a substituted or unsubstituted aromatic hydrocarbon group, a substituted or unsubstituted aromatic heterocyclic group, substituted or unsubstituted aralkyl group, a substituted or unsubstituted aryloxy group, a substituted or unsubstituted alkoxycarbonyl group, or a carboxyl group, and

wherein any two of R^1 to R^7 may form a ring, and any two of R^8 to R^{14} may form a ring.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 1/14/04

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the foregoing Amendment was filed by facsimile with the United States Patent and Trademark Office, Examiner Marie Yamnitzky, Group Art Unit # 1774 at fax number (703) 872-9306 this 14th day of January, 2004.

Phillip E. Miller
Reg. No. 46,060